REMARKS

In accordance with the foregoing, the claims have not been amended, and claim 41 has been added. Claims 1-26 and 41 are pending, with claims 1-17, 20-26 and 41 being under consideration.

REJECTION UNDER 35 U.S.C. §103

Claims 1-10, 12-17 and 21-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over George, II et al. (George), U.S. Patent No. 4,777,416 in view of Kim, U.S. Patent No. 6,308,114; and claims 11 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over George in view of Kim and further in view of Jacobs, U.S. Patent No. 6,580,246. These rejections are respectfully traversed.

George discusses a recharge docking system for a battery-powered mobile robot which navigates from node to node. George describes a means for sensing when the battery charge is below a predetermined level and halting the travel of the robot at the next navigational node when the battery voltage is sensed to be below that predetermined level. Further, George describes a means for independently determining a path from the next node to a base node where the robot's battery can be charged. See, George, col. 1, line 61 – col. 2, line 2.

The robot in George is described as traveling by way of moving towards successive goal nodes predefined in a map. See George, col. 7, line 47 – col. 8, line 5. Accordingly, the robot in George determines a path to a base node after it has arrived at the next node in its predetermined node map. In addition to the node map, George describes using beacons, one or more of which are mounted on the walls in the space to be protected by the robot to assist in locating an directing the robot in the area in which it is to roam. See col. 4, lines 16-19.

As only an example, the present Application relates to "a method and apparatus for automatically allowing a mobile robot, which autonomously travels a predetermined space, to return to a docking station or a designated location when a predetermined job is completed." Application, para. [0002], lines 1-4.

As a further example, the present Application describes a "distance calculator" which "calculates a difference Δt between the first time and the second time and then calculates a distance L between the docking station 210 and the mobile robot 220 using this difference Δt." See para. [0025] of present Application.

Claim 1 at least recites:

> determining whether the mobile robot approaches or moves away from the designated location, at a third location arrived at after the mobile robot rotates by the first direction angle and then travels a second distance; and

The Office Action cites to FIGS. 5 ,7, 9, 10, 13 and col. 6 line 30 - col. 7 line 15, col. 9 line 10 - col. 11 line 5, col. 11 line 60 - col. 12 line 65, as describing or suggesting the above feature of claim 1. In the Response to Arguments section, the Office Action states that George describes continuous angle measurement data along with sensor data between the robot and the base station using geometry.

Further, the Advisory Action cites to FIG. 5B of George and states that "the calculated angle is determined based on the moves away or approaches the designated location." The Advisory Action also cites to FIG. 7 of George stating that FIG. 7 shows a base station and a third location.

Applicants telephoned Examiner Jen to clarify wherein FIGS. 5B and FIG. 7 the Examiner was interpreting the claimed "designated location," "determining whether the mobile robot approaches or moves away from the designated location," "second direction angle" and the claimed "calculating a second direction angle of the mobile robot at the third location."

Applicants thank Examiner Jen for his explanation of his rejections and below attempt to address the outstanding rejections in view of the explanation provided in a telephone discussion on October 9, 2008, with Examiner Jen.

Examiner Jen explained his interpretation of FIG. 7A and the description thereof on col. 7, line 54 of George, describing a "goal node" as being interpreted to the claimed designated location.

Further, Examiner Jen indicated that he interpreted col. 9, line 10 – col. 11 line 5 of George, as describing the claimed "determining whether the mobile robot approaches or moves away from the designated location." However, as detailed below, Applicants respectfully submit that here, George is describing angle calculations between the robot and a beacon, and fails to discuss or suggest any calculations between the robot and the "goal node," which the Office Action is interpreting as the claimed "designated location."

Regarding the claimed "second direction angle," and the claimed "calculating a second direction angle of the mobile robot at the third location," Examiner Jen indicated that he interpreted the third location as being shown in FIG. 7A and described in col.7, line 50 of George

as one of the selected nodes shown in the map of FIG. 7A. Examiner Jen also indicated that he interpreted the claimed "second direction angle" as being described in FIG. 8A, and col. 8, lines 16-32, wherein George appears to be describing calibration systems used by the robot.

However, FIG. 8A, and col. 8, lines 16-32 of George appear to describe calibration systems to estimate the robot position and adjustments to body angle θ_B, but fail to describe or suggest a second direction angle to which the mobile robot will be controlled to travel in a direction of.

Applicants further submit that body angle θ_B of George, cannot be equated to the claimed "second direction angle" either, as the body angle θ_B of George, is described in col. 6, lines 15-18, as merely being the azimuthal angular distance from global zero to sensor zero. George fails to discuss or suggest that the robot's travel is controlled to be in a direction of the body angle θ_B. Therefore, Applicants further submit that George fails to describe or suggest the claimed "second direction angle," and the claimed "calculating a second direction angle of the mobile robot at the third location."

As briefly mentioned above, the angle calculations performed in George are not with respect to a destination location, but rather are calculated with respect to beacons. Applicants submit that FIGS. 5B of George merely describes the calculation of angles and distances from the beacons, described above as being mounted in the wall in the space to be protected by the robot, and is *silent regarding any angle or distance calculations between the robot and the base node/recharge station*.

As a beacon is described in George as being located in the wall and being used for directing the robot within a particular area, Applicants submit that a person of ordinary skill in the art would not equate the beacons described in George with the base node/recharge station of George. Again, Applicants are unable to find in the cited passages of George a discussion or suggestion setting forth such a claimed "determining whether the mobile robot approaches or moves away from the designated location."

The absence of angle and distance calculations between the robot and base node/recharge station of George is expected since, in George, it would not be necessary to make such calculations.

The robot of George merely moves from node to node along the path between the nodes, pre-defined in the map (shown in FIG. 7), until it reaches the base node/recharge station. The beacons of George, described in the passages cited by the Office Action, are merely used

in an obstacle avoidance system in case obstacles appear in the way of the path pre-defined in the map. However, as previously described, the beacons cannot meet the claimed "designated location," and thus, calculations of angles and distances between the robot and the beacons of George cannot be equated to "determining whether the mobile robot approaches or moves away from the designated location," as claimed.

Further, George describes in detail in col. 15, lines 26 to 41 the way in which the robot in George navigates back to the base node/recharge station during a time when the battery charge is determined to be low. Here, George states that a planner calculates a return path by considering the current node as the start node, and computes the shortest path from the current node to the goal node for each node in the goal list using a graph search algorithm such as Dijkstra's algorithm. Thus, travel of the robot in George to the base node/recharge station is performed node to node according to the predetermined list of nodes and angles between these notes noted in the map. Applicants further submit that in view of this additional description in George, that a person of ordinary skill in the art would not understand George to describe or suggest the features of claim 1.

Moreover, Applicants respectfully submit that the secondary reference of Kim fails to cure the abovementioned deficiency of George, as Kim describes robot movement via sound-direction using angles between sound receivers and one sound source, and not direction angles of the robot with respect to a first and second location.

Therefore, Applicants also respectfully submit that neither George nor Kim, whether considered alone or in combination, teach or describe at least the abovementioned features of claim 1.

Thus, in view of the above, Applicants respectfully submit that claim 1 and claims 2-10 and 12 which depend therefrom, patentably distinguish over the cited art.

Independent claims 13 and 26 at least recite similar features, with differing scope and breadth, and thus in view of the above reasons, Applicants respectfully submit that claims 13 and 26 and claims 14-17 and 21-25 which depend from claim 13 patentably distinguish over the prior art.

Favorable reconsideration and a withdrawal of the rejection against claims 1-10, 12-17 and 21-26 are respectfully requested.

Regarding the rejection of claims 11 and 20, Applicants respectfully submit that Jacobs similarly fails to cure the abovementioned deficiency of George, as Jacobs describes a robot

touch shield device, and the movement path of the robot of Jacobs also does not teach or suggest at least the claimed feature described above with respect to independent claims 1, 13 and 26.

Favorable reconsideration and withdrawal of the rejection against claims 11 and 20 are thus respectfully requested.

NEW CLAIM 41

New claim 41 at least recites features similar to claim 1 in differing scope. Therefore, for at least the reasons presented above regarding claim 1, Applicants submit that claim 41 patentably distinguishes over the cited art.

Favorable consideration of claim 41 is respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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